

What is claimed is:

1. A spring-lock type clamping apparatus, wherein

an annular piston (5) is inserted into a housing (3) hermetically and axially movably, and an output member (8) is inserted into the annular piston (5) hermetically and axially movably,

5 a lock chamber (11) is formed between the annular piston (5) and a base end wall (3a) of the housing (3), a release chamber (12) is formed between the annular piston (5) and a leading end wall (3b) of the housing (3), a spring (14) attached to the lock chamber (11) is adapted to move the annular piston (5) toward a leading end for locking, a pressurized fluid supplied to the release chamber (12) is adapted to move the annular piston (5) toward a base end for releasing,

10 a pressing surface (38) is provided on a leading end portion of the annular piston (5), a first inclined surface (41), which gets closer to the axis toward the leading end, is provided on an inner periphery of a peripheral wall of the release chamber (12), a second inclined surface (52), which gets closer to the axis toward the base end, is provided on an outer periphery of the output member (8), a plurality of rolling members (55) are inserted between the pressing surface (38),
15 the first inclined surface (41) and the second inclined surface (52) circumferentially at intervals,

when the spring (14) moves the annular piston (5) toward the leading end for locking, the pressing surface (38) moves each rolling member (55) toward the leading end and radially inward via the first inclined surface (41), and each rolling member (55) moves the output member (8) toward the leading end via the second inclined surface (52), whereby a moving stroke (S2) of the
20 output member (8) is set larger than a moving stroke (S1) of the annular piston (5) during the locking movement, followed by that the spring (14) is adapted to press an input surface (53) on an outer periphery of the output member (8) toward the leading end via the pressing surface (38) and the rolling members (55).

2. The spring-lock type clamping apparatus as set forth in claim 1, wherein

25 the first inclined surface (41) is formed by a tapered inner peripheral surface, the second inclined surface (52) is formed by a tapered outer peripheral surface, and the rolling members (55) are composed of balls or rollers.

3. The spring-lock type clamping apparatus as set forth in claim 1, wherein

30 the output member (8) is hermetically inserted into the leading end wall (3b) of the housing (3), a sectional area of a sealing portion (8b) of the output member (8) in the leading end wall (3b) is set to a value smaller than that of a sealing portion (8a) of the output member (8) in the annular piston (5).

4. The spring-lock type clamping apparatus as set forth in claim 1 or 2, wherein

35 a clamping arm (22) is arranged on the outside of the leading end wall (3b) of the housing (3), a leading end portion of a link member (23) is rotatably connected to a longitudinal

middle portion of the clamping arm (22), a base end portion of the link member (23) is rotatably connected to the leading end wall (3b), and an input portion (22a) of the clamping arm (22) is rotatably connected to an output portion (28) on the leading end of the output member (8).